Lower Upper Miocene Progradational (UM1 P1) Play

Discorbis 12 biozone
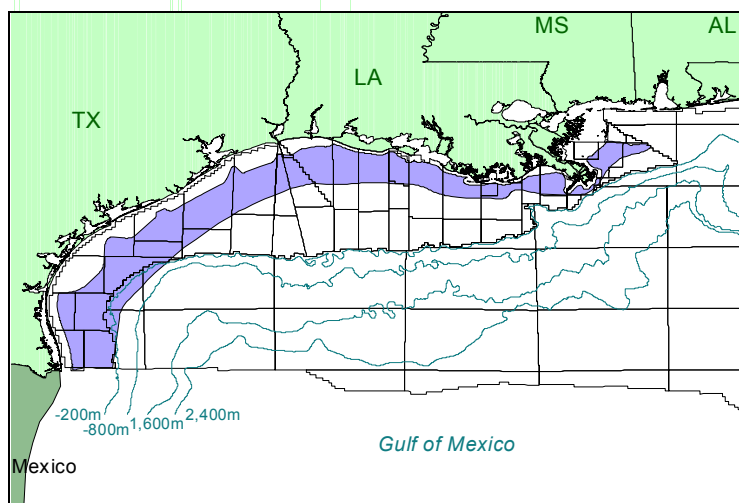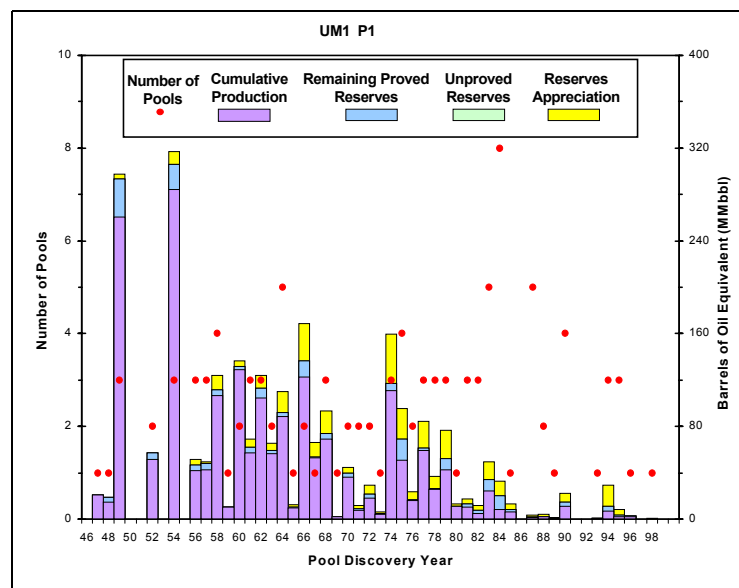

Figure 1. Play location.

Figure 2. Exploration history graph showing reserves addition and number of pool discoveries by year.

UM1 P1 Play 111 Pools 492 Sands	Minimum	Mean	Maximum
Water depth (feet)	9	63	380
Subsea depth (feet)	3778	9787	17260
Number of sands per pool	1	4	37
Porosity	15%	27%	33%
Water saturation	16%	30%	57%

Table 1. Pool attributes. Values are volume-weighted averages of individual reservoir attributes.

Play Description

The established Lower Upper Miocene Progradational (UM1 P1) play occurs within the *Discorbis* 12 biozone. The play extends from the South Padre Island Area offshore Texas to the Main Pass Area east of the present-day Mississippi River Delta (figure 1).

Updip in the Texas offshore, the play grades into the nearshore deposits of the Lower Upper Miocene Aggradational (UM1 A1) play. Updip in Louisiana, the UM1 P1 play continues onshore. To the northeast, the play is limited by the deposits of the Lower Upper Miocene Aggradational/ Progradational (UM1 AP1) play overlying the Cretaceous carbonate shelf. The UM1 P1 play continues to the southwest into Texas State and Mexican national waters. Downdip, the play grades into the deposits of the Lower Upper Miocene Fan 1 (UM1 F1) play.

Play Characteristics

The 29 reservoir sands of the offshore Texas area were deposited in the distal portion of prograding delta lobes or in offshore bars. Most of these sands have a coarsening-upward log character, but some retrogradational fining-upward sands are also present in the overall prograding section. Many of these sands are thin and poorly developed because of a low influx of clastics into the offshore Texas area during UM1 time. Consequently, many UM1 progradational reservoirs in the Texas offshore have not been prolific. In the South Padre Island and High Island Areas, the progradational facies is present but not productive.

The 463 reservoir sands of the offshore Louisiana area were deposited in more proximal portions of prograding lobes. From the West Cameron through Vermilion Areas, UM1 P1 deposits are characterized
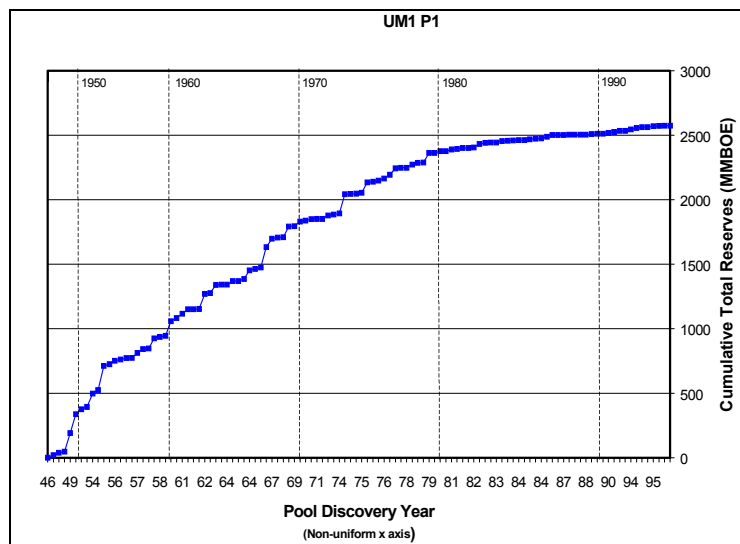
Figure 3. Plot of pools showing cumulative reserves by discovery order. Note the non-uniform x axis.

UM1 P1 Play Marginal Probability = 1.00	Number of Pools	Oil (Bbbl)	Gas (Tcf)	BOE (Bbbl)
Reserves				
Original proved	110	0.566	9.167	2.198
Cumulative production	–	0.512	8.304	1.989
Remaining proved	–	0.055	0.862	0.208
Unproved	1	0.001	0.001	0.001
Appreciation (P & U)	–	0.083	1.651	0.377
Undiscovered Conventionally **Recoverable Resources**				
95th percentile	–	0.036	0.627	0.155
Mean	26	0.055	0.755	0.190
5th percentile	–	0.081	0.886	0.229
Total Endowment				
95th percentile	–	0.686	11.445	2.730
Mean	137	0.705	11.573	2.765
5th percentile	–	0.731	11.704	2.804

Table 2. Assessment results for reserves, undiscovered conventionally recoverable resources, and total endowment.

by predominately thin, coarsening-upward sands separated by thick, clean shales. The central offshore Louisiana area was the locus of the main UM1 deltaic depocenter resulting in abundant, well-developed, thick sands. East of the Mississippi River Delta, UM1 P1 sediments are mostly shale with a few well-developed sands. Retrogradational, reworked sands with a thinning and backstepping log signature locally cap the play. Because these retrogradational sands are poorly developed and discontinuous, they are included as part of UM1 P1 play.

The majority of the fields in this play are structurally associated with normal faults and salt diapirs with hydrocarbons trapped on diapir flanks or in sediments draped over diapir tops. Other fields are associated with growth fault anticlines, while some fields contain hydrocarbon accumulations trapped by permeability barriers, updip pinchouts, or facies changes. Seals are provided by the juxtaposition of reservoir sands with shales and salt, either structurally (e.g., faulting, diapirism) or stratigraphically (e.g., lateral shale-outs, overlying shales).

Discoveries

The UM1 P1 play is predominantly a gas play, with total reserves of 0.650 Bbo and 10.818 Tcfg (2.575 BBOE), of which 0.512 Bbo and 8.304 Tcfg (1.989 BBOE) have been produced. The play contains 492 producible sands in 111 pools, and 110 of these pools contain proved reserves (table 1; refer to the Methodology section for a discussion of reservoirs, sands, and pools). The first reserves in the play were discovered in the Vermilion 71 field in 1947 (figure 2). Maximum yearly total reserves of 317 MMBOE were added in 1954, when three pools were discovered, including the largest pool in the play, West Delta 30 field, with 186 MMBOE in total reserves (figures 2 and 3). Ninety-nine percent of the play's cumulative production and 97 percent of the play's total reserves
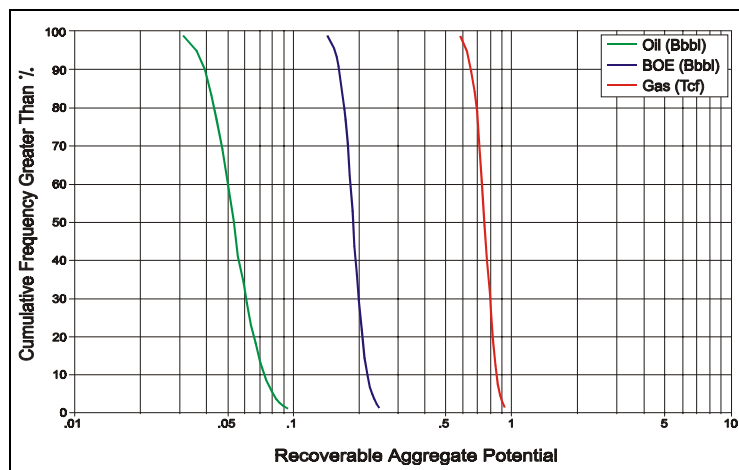
Figure 4. Cumulative probability distribution for undiscovered conventionally recoverable resources.
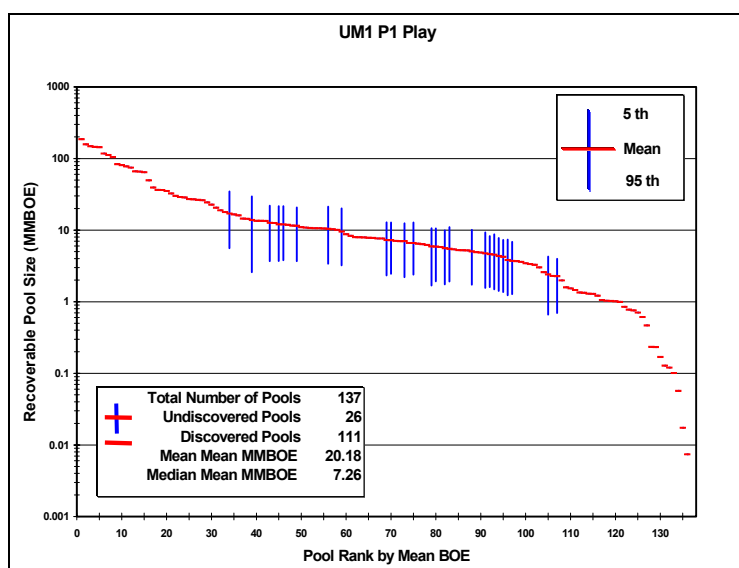

Figure 5. Pool rank plot showing the number of discovered pools (red lines) and the number of pools forecast as remaining to be discovered (blue bars).

have come from pools discovered prior to 1990. The most recent discovery, prior to this study's cutoff date of January 1, 1999, was in 1998.

The 111 discovered pools contain 965 reservoirs, of which 636 are nonassociated gas, 257 are undersaturated oil, and 72 are saturated oil. Cumulative production has consisted of 74 percent gas and 26 percent oil.

Assessment Results

The marginal probability of hydrocarbons for the UM1 P1 play is 1.00. The play has a mean total endowment of 0.705 Bbo and 11.573 Tcfg (2.765 BBOE) (table 2). Seventy-two percent of this BOE mean total endowment has been produced.

Assessment results indicate that undiscovered conventionally recoverable resources (UCRR) have a range of 0.036 to 0.081 Bbo and 0.627 to 0.886 Tcfg at the 95th and 5th percentiles, respectively (figure 4). Mean UCRR are estimated at 0.055 Bbo and 0.755 Tcfg (0.190 BBOE). These undiscovered resources might occur in as many as 26 pools. The largest undiscovered pool, with a mean size of 17 MMBOE, is forecast as the 34th largest pool in the play (figure 5). The forecast places the next four largest undiscovered pools in positions 39, 43, 45, and 46 on the pool rank plot. For all the undiscovered pools in the UM1 P1 play, the mean mean size is 7 MMBOE, which is substantially smaller than the 23 MMBOE mean size of the discovered pools. The mean mean size for all pools, including both discovered and undiscovered, is 20 MMBOE.

The UM1 P1 is a supermature play with BOE mean UCRR contributing only 7 percent to the play's BOE mean total endowment.